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Application Number : Patent Application No. 10-2000-0067014

Date of Application: November 11, 2000

Applicant: LG Electronics Inc.

COMMISSIONER(Sealed)

[Bibliographical Data]

[Document Name] Patent Application
[Right Classification] Patent
[Recipient] Commissioner of Korean Intellectual Property Office
[Submission Date] 2000.11.11
[International Patent Classification] H04B
[Title of the Invention] PACKET DORMANT HANDOFF METHOD FOR MOBILE COMMUNICATIONSYSTEM

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[Nationality] Korean
[Substantive Examination] filed
[Purpose] Submitted as above in accordance with the Articles 42 and 60 of the Patent Law Regulation Rules.

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[Commission Fee]
[Basic Filing Fee] 38,000 won
[Additional Filing Fee] 18 page 0
[Priority Document Claiming Fee] 0
[Substantive Examination Filing Fee] 5 claims 269,000 won
[Total] 307,000 won

[ABSTRACT OF THE DISCLOSURE]

The present invention relates to a method for serving a handoff in a mobile communication system.

A method for serving a packet dormant handoff in a mobile communication system, the method comprising the steps of:

(a1) discriminating whether a mobile station performs the dormant handoff into an area of a new base station controller/ packet controller function (BSC/PCF); and

(b1) providing, at the mobile switching center (MSC), an information of performing the dormant handoff for the mobile station to an old base station controller/ packet controller function (BSC/PCF), when the mobile station performs the dormant handoff into an area of the new base station controller/ packet controller function (BSC/PCF).

[Drawing of representative]

Fig. 3

[Index word]

mobile communication system, dormant handoff

[Specification]

[title of the invention]

PACKET DORMANT HANDOFF METHOD FOR MOBILE COMMUNICATION SYSTEM

[Description of the drawing]

Fig. 1 illustrates a configuration of the mobile communication system to serve a packet data communication

Fig. 2 is a time sequential chart illustrating a method of serving a packet dormant handoff of a related art

Fig. 3 is a time sequential chart illustrating a method of serving a packet dormant handoff according to the present invention.

[Detailed description of the invention]

[Purpose of the invention]

[Technical field of the invention and the related art]

The present invention relates to a method for serving a handoff in a mobile communication system, and more particularly to a method for serving a packet dormant handoff in a mobile communication system, which can transfer a state of performing the dormant handoff for a mobile station from a mobile switching center (MSC) to an old base station controller/ packet controller function (BSC/PCF), when a CDMA 2000 packet terminal is performed the dormant handoff into a new base station controller/ packet controller function (BSC/PCF).

Fig. 1 illustrates a configuration of the mobile communication system to serve a packet data communication. Referring to Fig.1, the mobile communication system includes a mobile station (MS) 101, a base transceiver station (BTS) 102 connected with the mobile station 101 by the radio link, a base station controller/packet control function (BSC/PCF) 103 connected with the base transceiver station (BTS) 102, a mobile switching center/visitor location register (MSC/VLR) 104 connected with the base station controller/packet control function (BSC/PCF) 103, a home location register (HLR) 105 connected with the mobile switching center/visitor location register (MSC/VLR) 104 to communicate with other communication networks 106 such as PSTN, PCS, and PLMN (public land mobile network). The base station controller/packet control function (BSC/PCF) 103 is connected to an intranet 108 through PDSN 107 and then connected to Internet 109.

In the mobile communication system constructed as above, if the mobile station (MS) 101 for CDMA 2000 packet data service requires the packet data service, the base station controller/packet control function (BSC/PCF) 103 decides a destination of the PDSN 107 for transmitting the packet data. At this time, the radio traffic channel and radio link protocol are established in the radio interval between the mobile station (MS) 101 and the base station controller (BSC). Also, A8 traffic link for transferring point-to-point protocol (PPP) link data between the mobile station (MS) 101 and the PDSN 107, is established between the base station controller (BSC) and the packet control function (PCF), and A10 radio-packet(R-P) link for transferring the PPP link data between the mobile station (MS) 101 and the PDSN 107 is established between the packet control function (PCF) and the PDSN 107. Here, the A8 interface carries a user traffic between the base transceiver station (BTS) and the packet control function

(PCF), while the A10 interface carries the user traffic between the packet control function (PCF) and the PDSN 107.

At this time, the connection of the packet data service at the mobile station (MS) 101 is achieved by an active state or an inactive state for the packet data service. The packet data service inactive state represents a state that the mobile station (MS) 101 is not served by the packet data service, and can convert the packet data inactive state into the packet data active state when a packet data service activation such as a call origination for the packet data by the mobile stations user or activations according to other manners are performed. And, the packet data service active state is to establish and maintain both the PPP link between the mobile station (MS) 101 and the PDSN 107, and between the packet control function (PCF) and the PDSN 107 described as above. The packet data service active state is operated with a packet active state or a packet dormant state according to the radio link state. Here, the packet active state is to maintain the A8 link by occupying the radio traffic channel at the mobile station (MS) 101 and maintaining the radio link protocol (RLP), and to transmit/receive the packet data. While, the packet dormant state is to control the mobile station (MS) 101 at the base station controller (BSC) by releasing the radio channel and the A8 link, and to release the radio traffic channel.

Fig. 2 is a time sequential chart illustrating control procedures (step a1 to step n1) of serving a packet dormant handoff of a related art.

Referring to Fig. 2, first, an origination message is transmitted from a mobile station (MS) to a target BS/PCF in a state that of setting a data ready to send(DRS) set as '0' to get the packet data service when a new packet zoon identifier (ID) in step a1.

The target BS/PCF transmits an acknowledge response message on receiving the

origination message to the mobile station (MS) in step b1.

The target BS/PCF prepares and transmits a connection management (CM) service requirement message to a mobile switching center (MSC), and a timer T303 is driven at a time in step c1.

Next, the mobile switching center (MSC) requires assignment of radio resources to the target BS/PCF in response to the service requirement message, and a timer T10 is driven at a time in step d1. At this stage, the target BS/PCF stops the timer T303 as soon as receiving the assignment requirement.

The target BS/PCF requires A11 registration to a target PDSN for the packet data service by a registration requirement message including a mobility event indicator within the vendor/organization specific extension in step e1. At this time, the target BS/PCF drives a timer Tregreq representing a timer registration requirement.

Next, the target PDSN transmits A11 registration reply message to the target BS/PCF in step f1. At this time, the target BS/PCF stops the timer Tregreq. The A11 interface carries signaling information between the PCF and the PDSN.

The traffic channel (TCH) and PPP link are established between the target BS/PCF and the mobile station (MS) as result of each above step, and thereby registering a mobile IP (MIP) in step g1. And the base station (BS) transmits an assignment complete message to the mobile station (MS) in step h1.

At some point, A11 registration life timer for the A10 link in the source PDSN shall be expired. Then the source PDSN transmits A11 registration renewal message as the notification

of the re-registration to the source BS/PCF, and the source PDSN drives a timer Tregupd in step i1.

Next, the source BS/PCF transmits A11 registration recognition message to the source PDSN in step k1, and then the source PDSN transmits the registration message to the source PCF in step l1.

Target PCF transmits A11 registration request message to the target message in step m1, and then the target PDSN transmits A11 registration response message to the target PCF in step n1.

Referring to Figs. 1 and 2, the mobile switching center (MSC) does not transfer the information of dormant handoff to the source BS/PCF, when the mobile station (MS) is moved at the dormant state from an area of the source or old base station controller/packet control function (BSC/PCF) into an area of the target or new base station controller/packet control function (BSC/PCF) in the related art.

The operation will be explained under the conditions that the mobile station (MS) is moved from the second base station controller/packet control function (BSC/PCF) into the first base station controller/packet control function (BSC/PCF).

In the packet dormant state of the mobile communication, a objective packet data serving node (PDSN) for connecting is not a packet data serving node (PDSN2) where the mobile station (MS) is already established the PPP link, but the packet data serving node (PDSN1) when the mobile station (MS) is moved from an old area of the first base station controller/packet control function (BSC/PCF) into a new area of the second base station controller/packet control function (BSC/PCF).

In the case, the mobile switching center (MSC) provides the information that of performing the dormant handoff to a new target base station controller/packet control function (BSC2/PCF2), and thereby setting the radio-protocol link between the new target base station controller/packet control function (BSC2/PCF2) and the new target data serving node (PDSN2). Also, the new target data serving node (PDSN2) resets the PPP link and transmits FA advertisement to register the MIP registration, since the MIP mobile station (MS) is newly visited.

However, it is clearly noted that the mobile switching center (MSC) does not transfer the dormant handoff information to the source base station controller/packet control function (BSC1/PCF1) and the source packet data serving node (PDSN).

Accordingly, the old source packet data serving node (PDSN1) can release the radio-protocol link in case that the source packet data serving node (PDSN) surely controls to A10 MIP time out, an upper layer PPP link time out, or the MIP registration time out as shown in step i1 of Fig. 2.

Hence, there is a drawback that the radio-protocol link resource of the old source PCF and IP resource of the old source PDSN are wasted until the time out is completed.

[Technical solution to be solved]

The present discloses a method for serving a packet dormant handoff in a mobile communication system, which can transfer a state of performing the dormant handoff for a mobile station from a mobile switching center (MSC) to an old base station controller/ packet controller function (BSC/PCF), when a CDMA 2000 packet terminal is performed the dormant

handoff into a new base station controller/ packet controller function (BSC/PCF).

Accordingly, the old source packet data serving node (PDSN1) can release the radio-protocol link and thereby efficiently using the limited radio resource and IP resources of the PDSN.

[Operation and constitution of the invention]

The present invention is comprising the steps of:

(a1) discriminating whether a mobile station performs the dormant handoff into an area of a new base station controller/ packet controller function (BSC/PCF); and

(b1) providing, at the mobile switching center (MSC), an information of performing the dormant handoff for the mobile station to an old base station controller/ packet controller function (BSC/PCF), when the mobile station performs the dormant handoff into an area of the new base station controller/ packet controller function (BSC/PCF).

The packet dormant handoff of the invention in mobile communication system discloses that said dormant handoff information is transferred as the location renewal message comprising the handoff information.

This invention discloses that the old BSC/PCF releases R-P link of PDSN according to the transferred dormant handoff information.

This invention discloses that the location renewal message is responsed to the MSC when old BSC/PCF completes to release R-P link of PDSN according to the transferred handoff information.

Fig. 3 is a time sequential chart illustrating a method of serving a packet dormant handoff according to the present invention.

Referring to Fig. 3, the description of steps a2 to h2 will be omitted, since the steps a2 to h2 are the same as the procedures of steps a1 to h1 as shown in Fig. 2.

After performing steps a2 to h2, the mobile switching center (MSC) establishes the radio-packet(R-P) link with the new packet control function/packet data serving node (PCF/PDSN) when the MSC detects the dormant handoff from the mobile station (MS) into the new target base station controller/packet control function (BSC/PCF), and transmits a location renewal message to the old source base station controller/packet control function (BSC/PCF) when the radio-protocol link is established in step i2.

At this time, the location renewal information is transmitted to the source base station (BS) from the mobile switching center (MSC), and a cause value of an element of the location renewal information is the packet dormant handoff in step i2.

Next, as the reaction for the i2 message, the source base station controller/packet control function (BSC/PCF) immediately transfers the information that the dormant mobile station (MS) is entered into an area of the new base station controller/packet control function (BSC) to the source packet control function (PCF) by using A9-renewal-A8 message in step j2. Then, the source packet control function (PCF) transmits A11 registration request message with the lifetime 0 to the old source packet data serving node (PDSN), and the old PDSN releases the Radio- Packet (R-P) link.

At this time, the old packet data serving node (PDSN) removes a visitor table of the corresponding mobile station (MS), and transmits charging information to authentication

authorization and accounting (AAA) server.

Next, the releasing of the R-P link is completed by responding A11 registration reply message at the source packet data serving node (PDSN), the source packet control function (PCF) removes the R-P link table for the mobile station (MS) in step k2.

Then, the dormant handoff performing from the base station controller/packet control function (BSC/PCF) into the mobile station (MS) is completed by transmitting A9-renewal-A8 Acknowledge reply message from the source packet control function (PCF) to the source base station controller (BSC) and transmitting a location renewal accept message from the source base station controller (BSC) to the mobile switching center (MSC) in step l2.

While the invention has been shown and described with reference to certain preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

That is, referring to Figs. 1 and 3, the technical idea and concept of the present invention may be embodied, even though the mobile station (MS) is entered into the area of the old mobile switching center (MSC) into new mobile switching center (MSC). The old mobile switching center (MSC) transmits the location renewal information to the old base station controller/packet control function (BSC/PCF), when the mobile station (MS) performed the dormant handoff into the other new mobile switching center (MSC) receives the registration renewal information with American National Standards Institute (ANSI)-41 message that is a standard of roaming service object of the mobile station, and the mobile station (MS) is on the packet dormant handoff state, and thereby early releasing the R-P link. At this time, the dormant handoff between the mobile

switching centers can be allowable, since the information for the serving packet control function (PCF) is stored into the mobile switching center/visitor location register (MSC/VLR) described as above.

[the effect of the invention]

According to the packet dormant handoff, a mobile communication system can transfer a state of performing the dormant handoff for a mobile station from a mobile switching center (MSC) to an old base station controller/ packet controller function (BSC/PCF), when a CDMA 2000 packet terminal is performed the dormant handoff into a new base station controller/ packet controller function (BSC/PCF). Accordingly, the old source packet data serving node (PDSN1) can release the radio-protocol link and thereby efficiently using the limited radio resource and IP resources of the PDSN.

What is claimed is ;

1. A method for serving a packet dormant handoff in a mobile communication system, the method comprising the steps of:

(a1) discriminating, at a mobile switching center (MSC) or MM/CC(mobility management and call control) entity, whether a mobile station performs the dormant handoff into an area of a new base station controller/ packet controller function (BSC/PCF); and

(b1) providing, at the mobile switching center (MSC) or MM/CC(mobility management and call control) entity, an information of performing the dormant handoff for the mobile station to an old base station controller/ packet controller function (BSC/PCF), when the mobile station performs the dormant handoff into an area of the new base station controller/ packet controller function (BSC/PCF).

2. The method according to claim 1, wherein the dormant handoff information comprises at least a location renewal message.

3. The method according to claim 1, wherein the information of performing the dormant handoff is provided after setting a R-P link with the new base station controller/ packet control function (BSC/PCF) and a new packet data serving node (PDSN).

4. The method according to claim 2, wherein a cause value as an element of the location renewal message is the packet dormant handoff.

5. The method according to claim 1, further comprising the step of releasing the R-P link by transferring a registration request message from the old base station controller/packet controller function (BSC/PCF) to an old packet data serving node (PDSN), after providing the information of performing the dormant handoff.

6. The method of claim 5, further comprising:

removing a visitor table of a corresponding mobile station when the original PDSN receives the registration request message from the original BSC/PCF; and

transmitting charging data to a corresponding sever (AAA Server).

7. A method for serving a packet dormant handoff in a mobile communication system, the method comprising the steps of:

receiving, at an old mobile switching center (MSC), a location renewal information of a mobile station which performs the dormant handoff on a new mobile switching center (MSC),wherein he old mobile switching center (MSC) receives the registration renewal information of the mobile station which performs the dormant handoff on the new mobile switching center (MSC) by using an American National Standards Institute (ANSI)-41 message ;

discriminating whether the mobile station is on a state of the packet dormant handoff when the location renewal information is received;

releasing a R-P link by transferring the registration renewal information from the old mobile switching center (MSC) to the old base station controller/ packet controller function (BSC/PCF), if the mobile station is at the packet dormant handoff state.